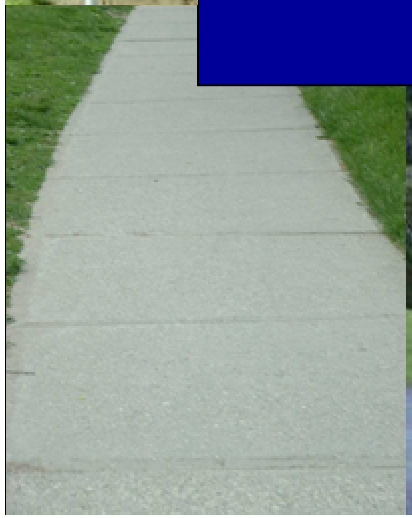
International Scan on Asset Management:

Australia, Canada, England, and New Zealand

April 8-April 23, 2005



Purpose

Investigate best case examples of asset management techniques and processes in the world…and identify lessons and applications for the U.S.

Sponsored by AASHTO, FHWA, and NCHRP

Where we went….

What were the drivers for adopting asset management approaches?

- Limited resources
- Increasing demands on and use of existing infrastructure
- Desire for credibility with elected officials and the public, that is, linking funding to system performance
- Where private provision of services was used, asset management was a way of providing strategic oversight

- Natural evolution in the development of individual infrastructure management systems
- Desire to evolve to a system that allows trade-offs among different asset categories and between asset strategies
- Legislative or governmental mandate, e.g.,
  - Road Management Act in Victoria
  - Local Transport Plan 2 guidance in England
  - Local Government Act in New Zealand

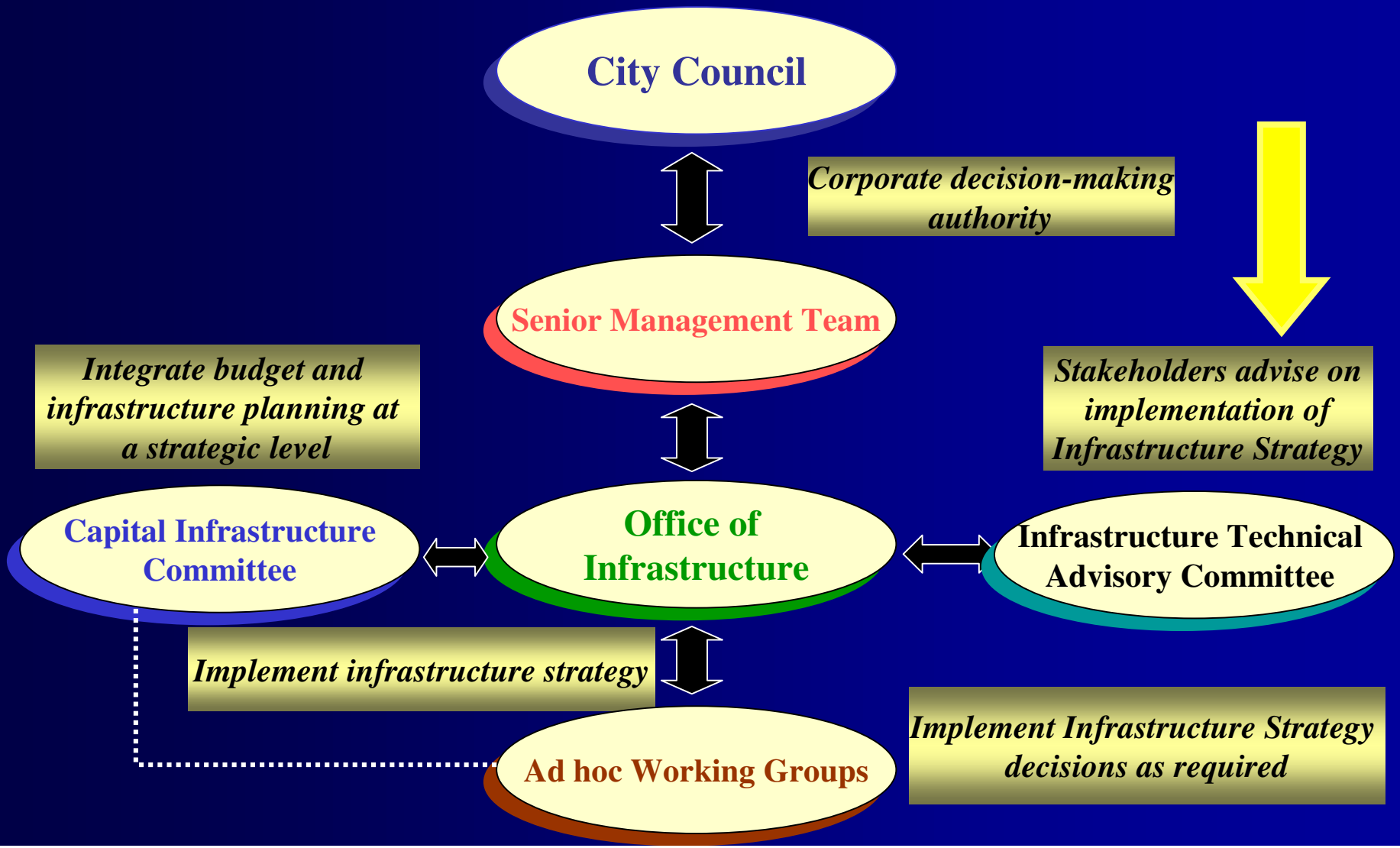
What we found…

Each site visited has made a long term commitment to, and allocated resources for, developing an asset management program….

and are continuing to “evolve” this program in response to agency decision-making needs.

Many agencies and/or jurisdictions have set up an organizational support structure for asset management….

Infrastructure Management Approach in Edmonton



Manager of Asset Management--VicRoads

Role

--Develop strategies and programs for maintenance

--Monitor condition of the road network

--Recommend maintenance investment levels

--Benchmark performance

--Develop, maintain & support management systems

--Manage inventory systems

Team

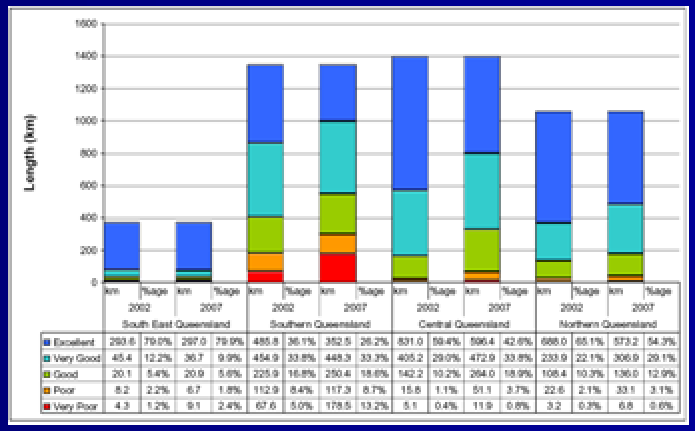
9 in total plus support from specialist areas

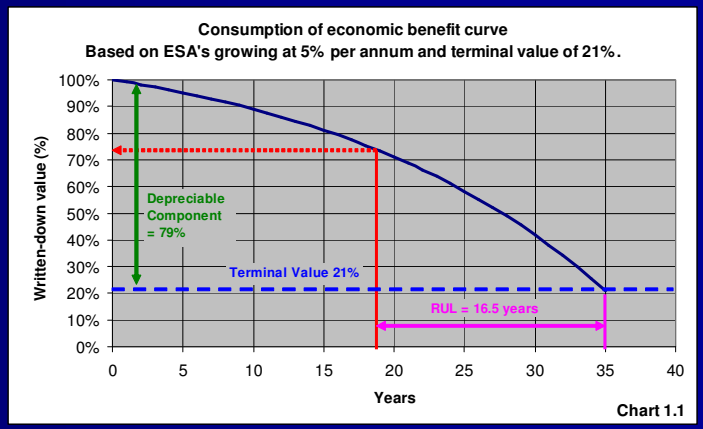
Asset management has been integrated into many corporate or agency planning and policy documents, and thus is related to decision making in different levels of an organization

for example….

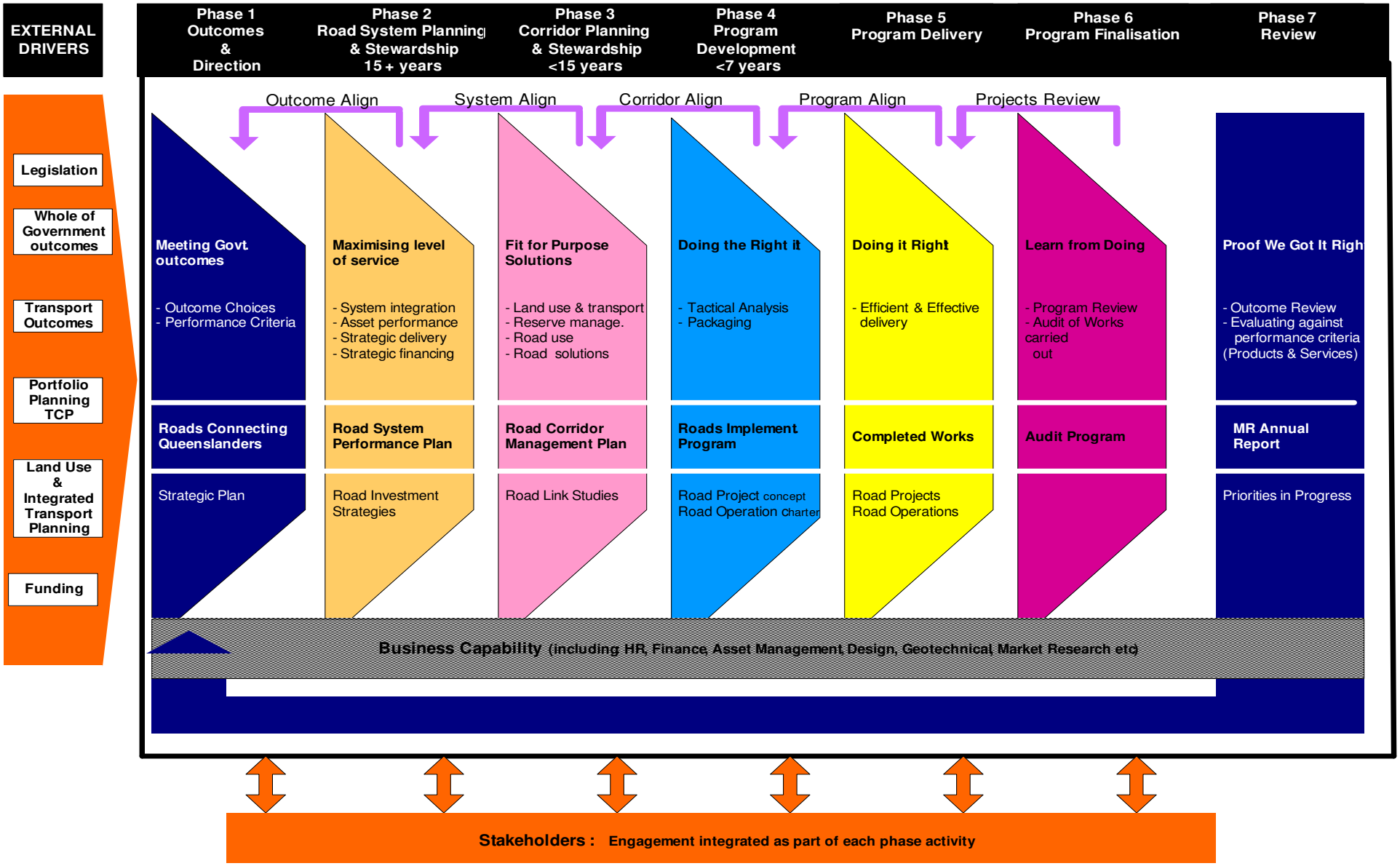
Queensland's Business Decision-making Needs--Corporate level

- Road condition performance reporting
- Network asset investment studies
- Corridor planning
- Asset valuation





STRATEGIC FRAMEWORK FOR ROAD SYSTEM ASSET MANAGEMENT



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Key performance measures and indicators provided a critical point of departure and an accountability reference for asset management programs

Performance Measures in Alberta

- Three key measures
  - Condition
  - Utilization
  - Functionality
- Common framework across infrastructure types
- Ministries develop specific measures

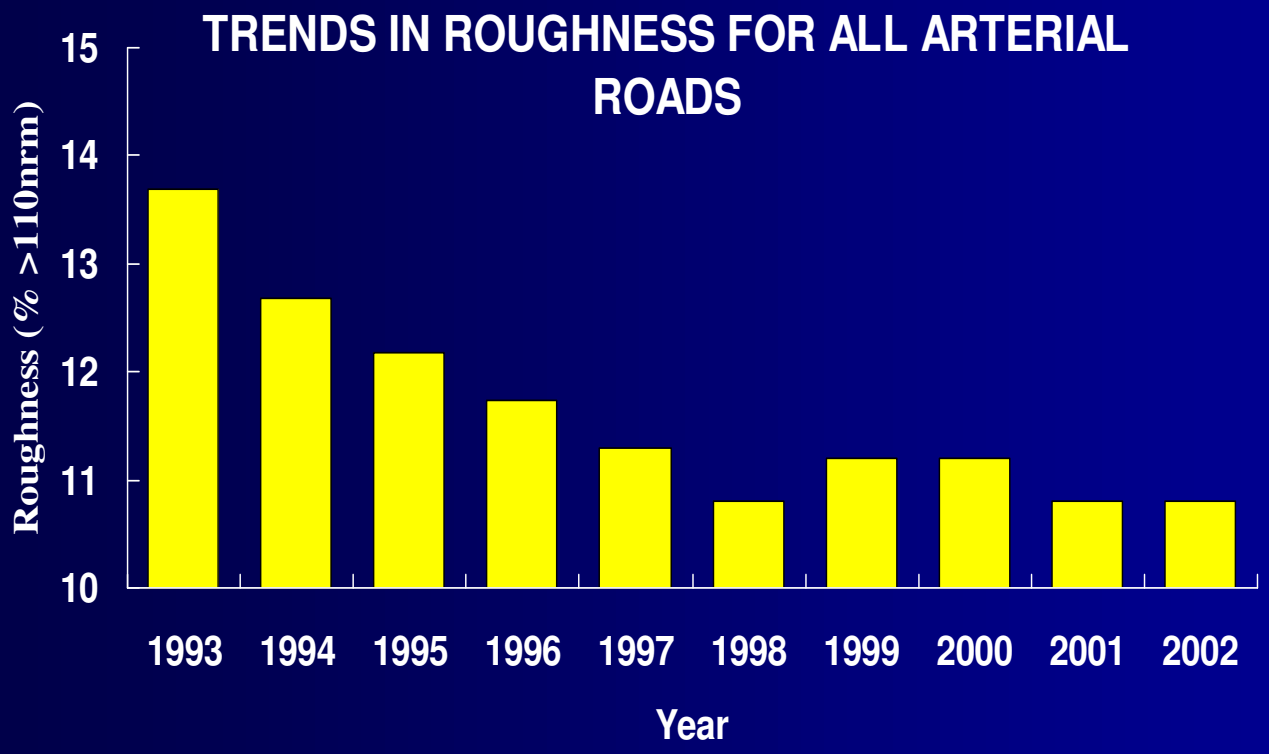
Alberta
INFRASTRUCTURE AND TRANSPORTATION

In New Zealand….

- Performance is measured in both absolute terms and in the reporting of trends
- Key measures are identified in the Statement of Intent and reported in the Annual Plan
- Long term asset management planning is significantly influenced by achievement of the performance measures, but is also strongly influenced by whole of life costs, just-in-time intervention and deterioration modelling.

Pavement roughness was a key performance measure almost everywhere

Pavement inventory and condition report in Victoria



vic roads International

In some cases, asset management plans have been developed or are in the process of being developed

Asset Management Plan in New Zealand -Key Components

- Introduction and plan objectives
- Levels of service and performance standards
- Asset management business practices
- Asset portfolio description (inventory, condition, performance)
- Future demand and growth
- Risk management

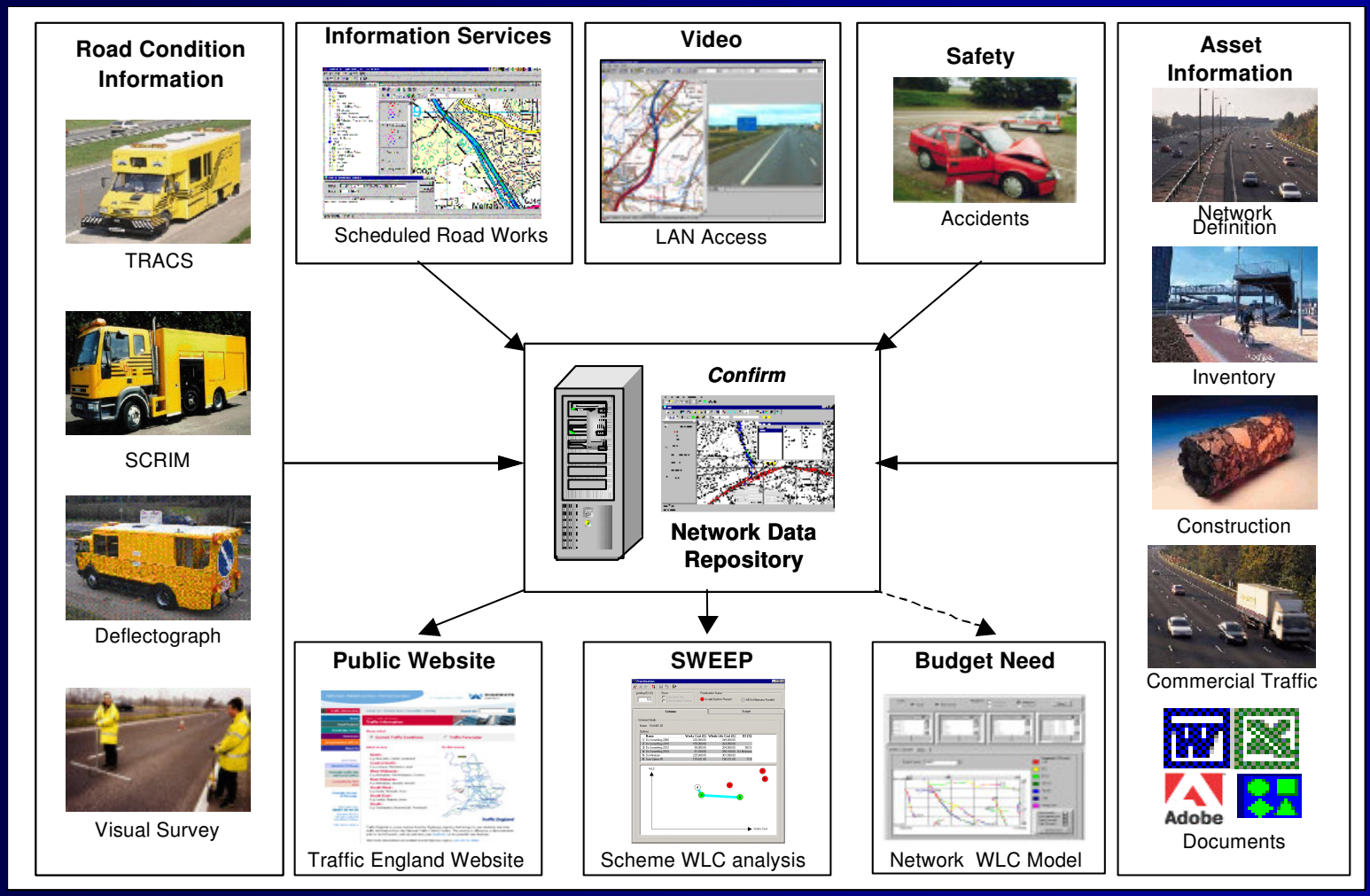
Key Components, cont'd

- Lifecycle management
  - Operations, maintenance, renewals, capital, disposals
  - Structural and corridor
- Financial summary
  - Cash flow forecasts
  - Valuation and decline in service potential forecasts
- Plan improvement, review and monitoring

Infrastructure management systems were in widespread use, but in most cases they were stand-alone systems linked with a locational referencing system

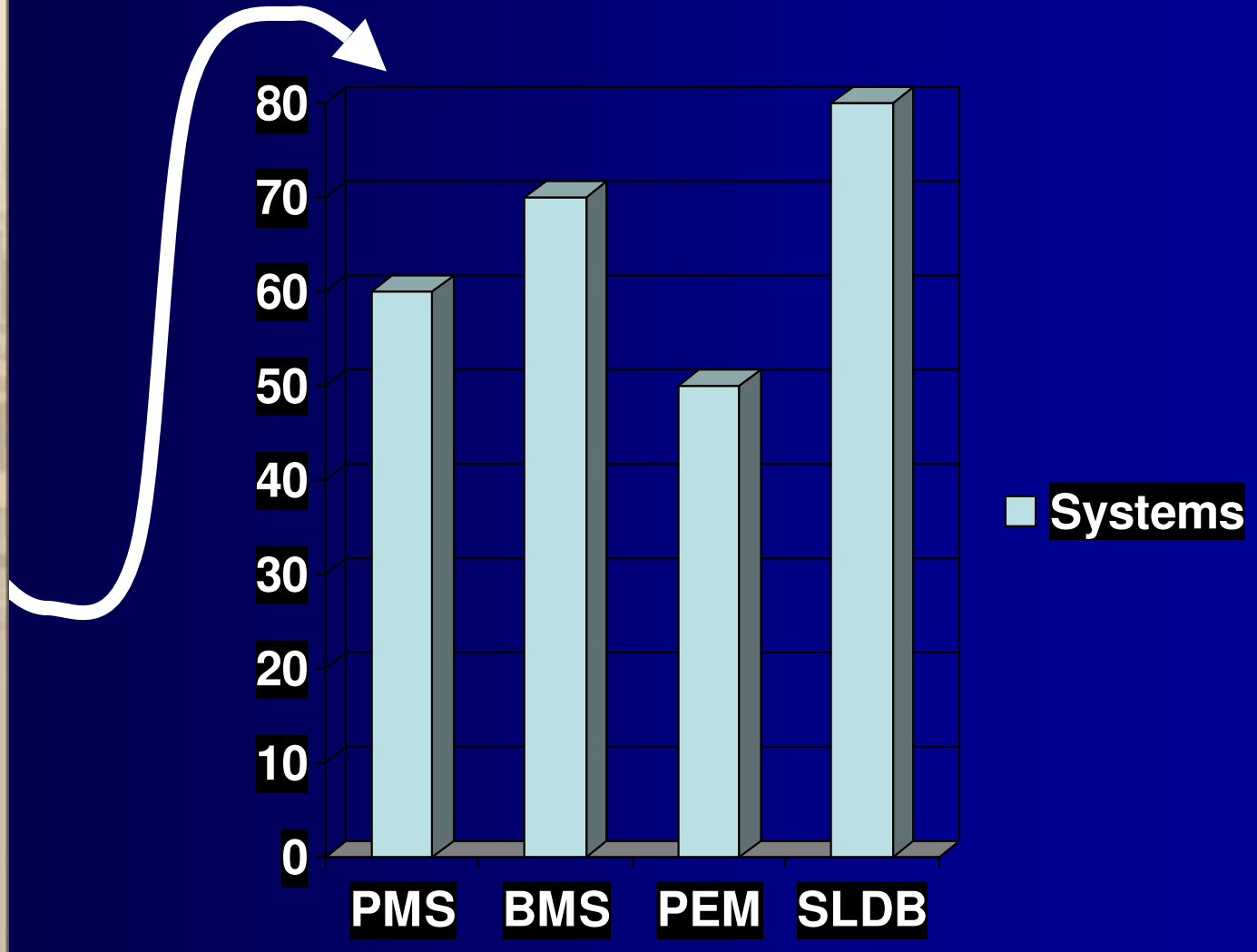
HIGHWAYS AGENCY

Highways Agency Pavement Management System Overview



Percent of local governments in England having different information systems



These information systems produce a wide range of useful information

Some no more than basic inventory data, while others can produce performance and condition reports….for example

Use of Asset Data in New South Wales

STANDARDS

Section	Speed Environment	Lane Width	Shoulder Width	Shoulder Seal Width
38	110	3.50	2.0	1.0
39	110	3.50	2.0	1.0
40	110	3.50	2.0	1.0
41	110	3.50	2.0	1.0
42	110	3.50	2.0	1.0

USAGE

Current (2002)

Section	Truck	Artic	Multi Artic	Light	Total
38	133	382	165	2943	3623
39	133	382	165	2387	3067
40	133	382	165	2041	2721
41	133	382	165	2041	2721
42	133	382	165	2041	2721

10 Year Projection(2012)

Section	Truck	Artic	Multi Artic	Light	Total
38	173	497	215	3825	4710
39	173	497	215	3102	3987
40	173	497	215	2652	3537
41	173	497	215	2652	3537
42	173	497	215	2652	3537

Route Performance Values

Range - shows the proportion of the section in a particular "bin"

Roughness (counts/km)
- < 70
- 70 - 110
- 111 - 140
- > 140

Lane Width (m)
- > 3.4
- 3.2 - 3.4
- < 3.2

Deficiency - applies to whole section

Bridge Width (each instance)
- Narrow
- Very Narrow

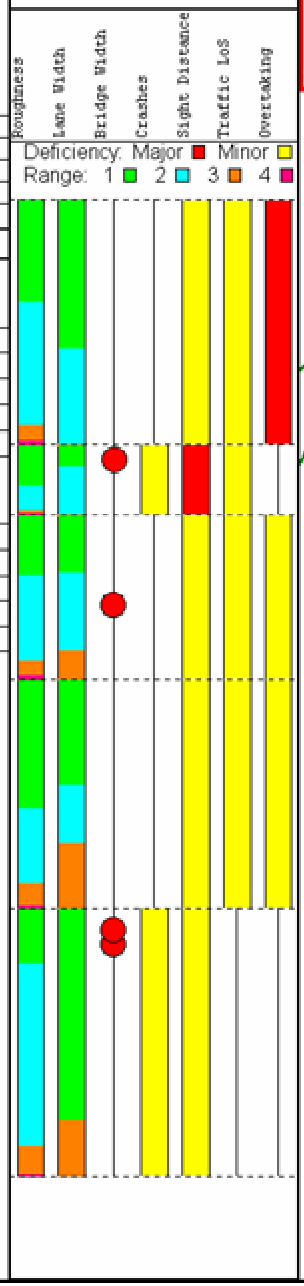
Sight Distance
- < 15% below standard
- > 15% below standard

Crashes
- 25 - 37.5 per 100mvkm
- > 37.5 per 100mvkm

Traffic LoS
- C
- D, E, F

Overtaking
- 25% - 35% of traffic following
- > 35% of traffic following

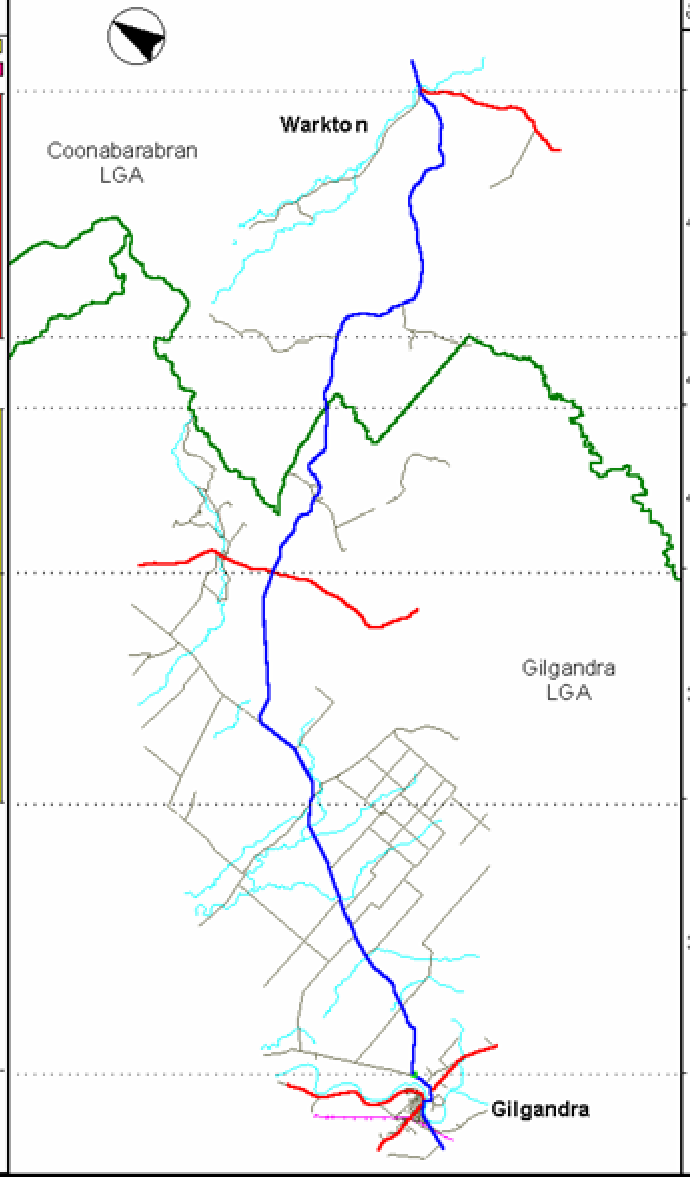
Route Performance



Melbourne to Brisbane Corridor
Link MB2 & MB3, SH17

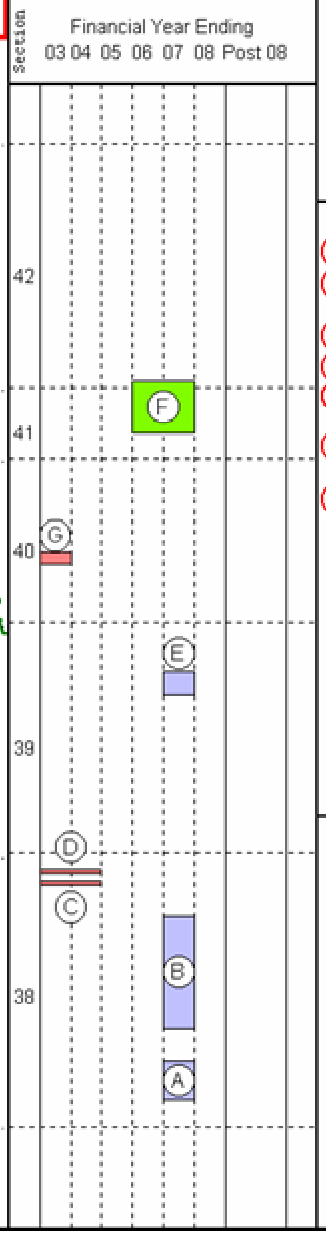
RTA

Sheet 8 of 11



PROPOSED PLAN OF WORKS

As at June 2002



- KEY -

- Pavement Reconstruction & Widening
- Bridge
- Deviation

PROJECT NAME

- A 4-7 km north of Gilgandra
- B 10-18 km north of Gilgandra
- C Hodgkiss Creek
- D Bidden Creek
- E 34-36 km north of Gilgandra
- F Wallumburrawang Creek Deviation
- G Uargon Creek

Note:

Maintenance projects are not shown. The location and timing of these works vary in response to asset condition and user costs so as to minimise the whole of life costs of maintaining the network to agreed condition.

Non location specific minor works not displayed.

26-02-2003

Similar to the U.S., data is collected on a data collection schedule, but it seems that in most cases a lot more data is collected than what is typical in the U.S.

Data Management at VicRoads

- A set of IT system and data management principles have been established.
  - Manage data as a resource.
  - Develop corporate wide understanding of road asset information.
  - Improve information accessibility.
  - Reduce data management costs.
  - Align data requirements with business goals and objective.
- The data management principles are underpinned by agreed business rules.
- A procedure has been development to provide guidelines for the maintenance of data to ensure data integration and reduce data duplication and redundancy.

Approaches to Technical Analysis

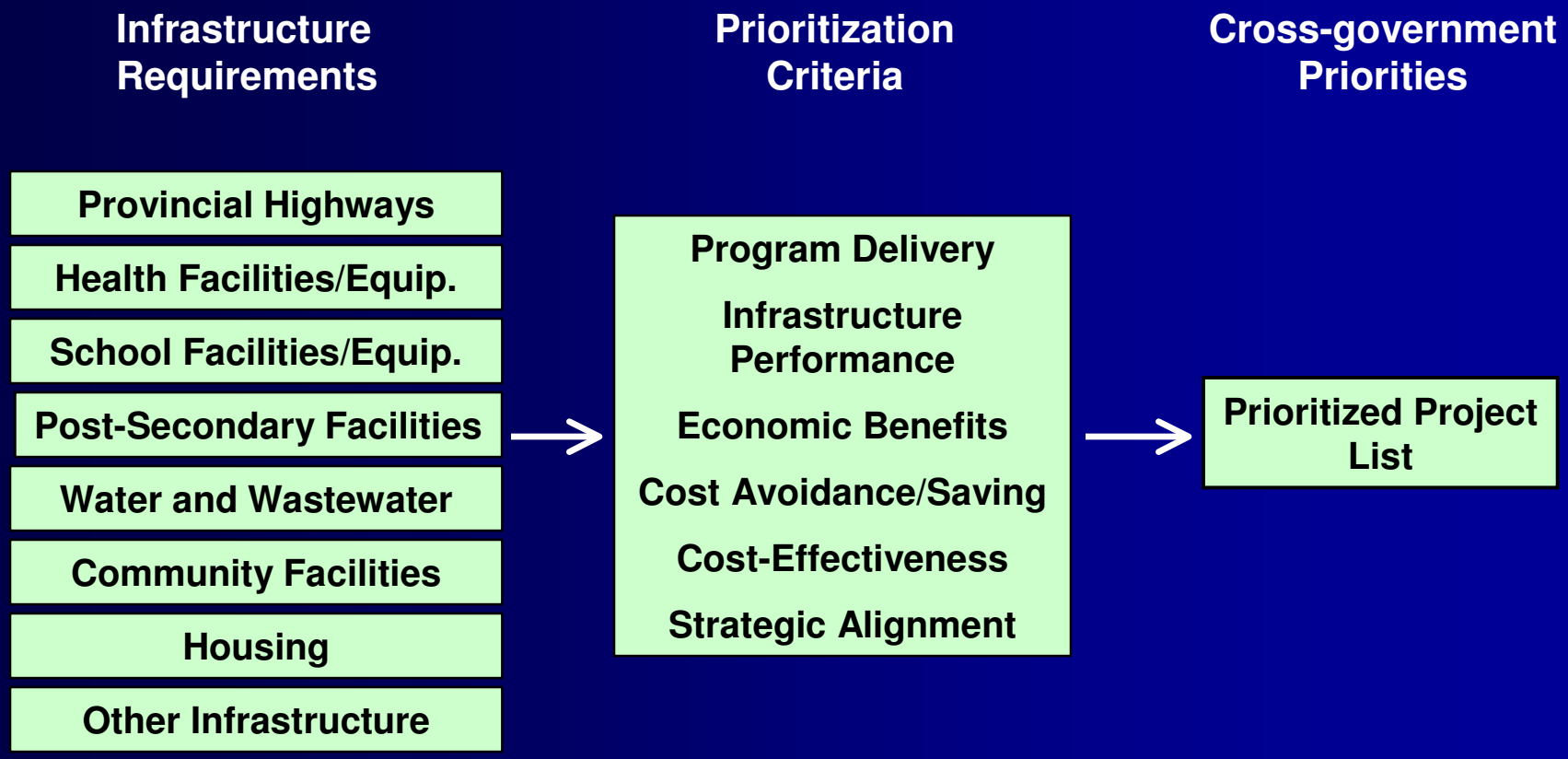
In only a few cases was any effort made to conduct analysis-driven trade-off assessments; those that did were heavily based on engineering judgement.

However, it was clear that all of the agencies were working toward such a capability.

Ranking Example From Victoria

- Rehabilitation formula = R*T*L*D/C
  - R is % roughness > target level
  - T is traffic
  - L is life of treatment
  - D is rate of deterioration
  - C is unit cost of treatment
- Statewide ranking of individual projects to a defined budget
- Crude consideration of life cycle costs

Project Prioritization--Alberta



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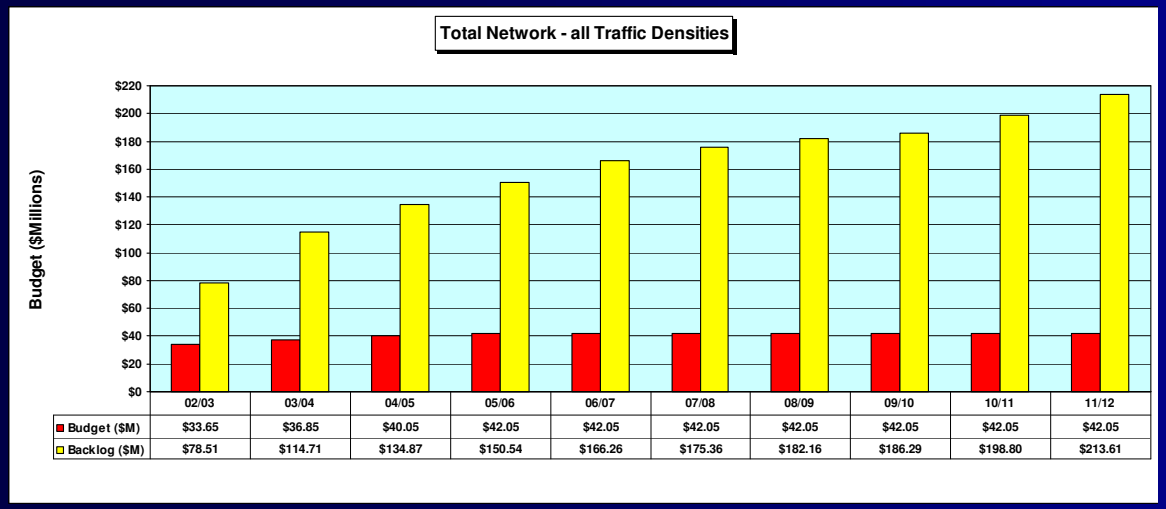
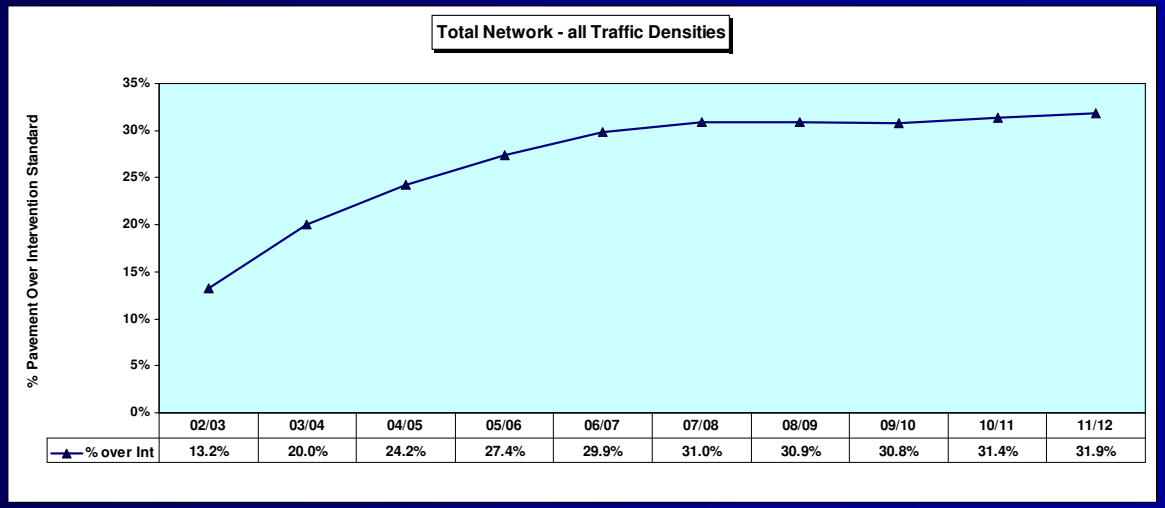
Scenario Analysis

Several agencies used deterioration values and assumptions to conduct scenario analyses for future investment needs

"Maintain 2005/06 Funding Level Out to 10 Years" Scenario--Brisbane



	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
Budget ($M)	$33.65	$36.85	$40.05	$42.05	$42.05	$42.05	$42.05	$42.05	$42.05	$42.05
Backlog ($M)	$78.51	$114.71	$134.87	$150.54	$166.26	$175.36	$182.16	$186.29	$198.80	$213.61



	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
% over Int	13.2%	20.0%	24.2%	27.4%	29.9%	31.0%	30.9%	30.8%	31.4%	31.9%

Life cycle costing (also known as “whole-of-life” costing) has been adopted in each site as the basic approach toward program and project costing. Importantly, data identification and collection were targeted to support this approach.

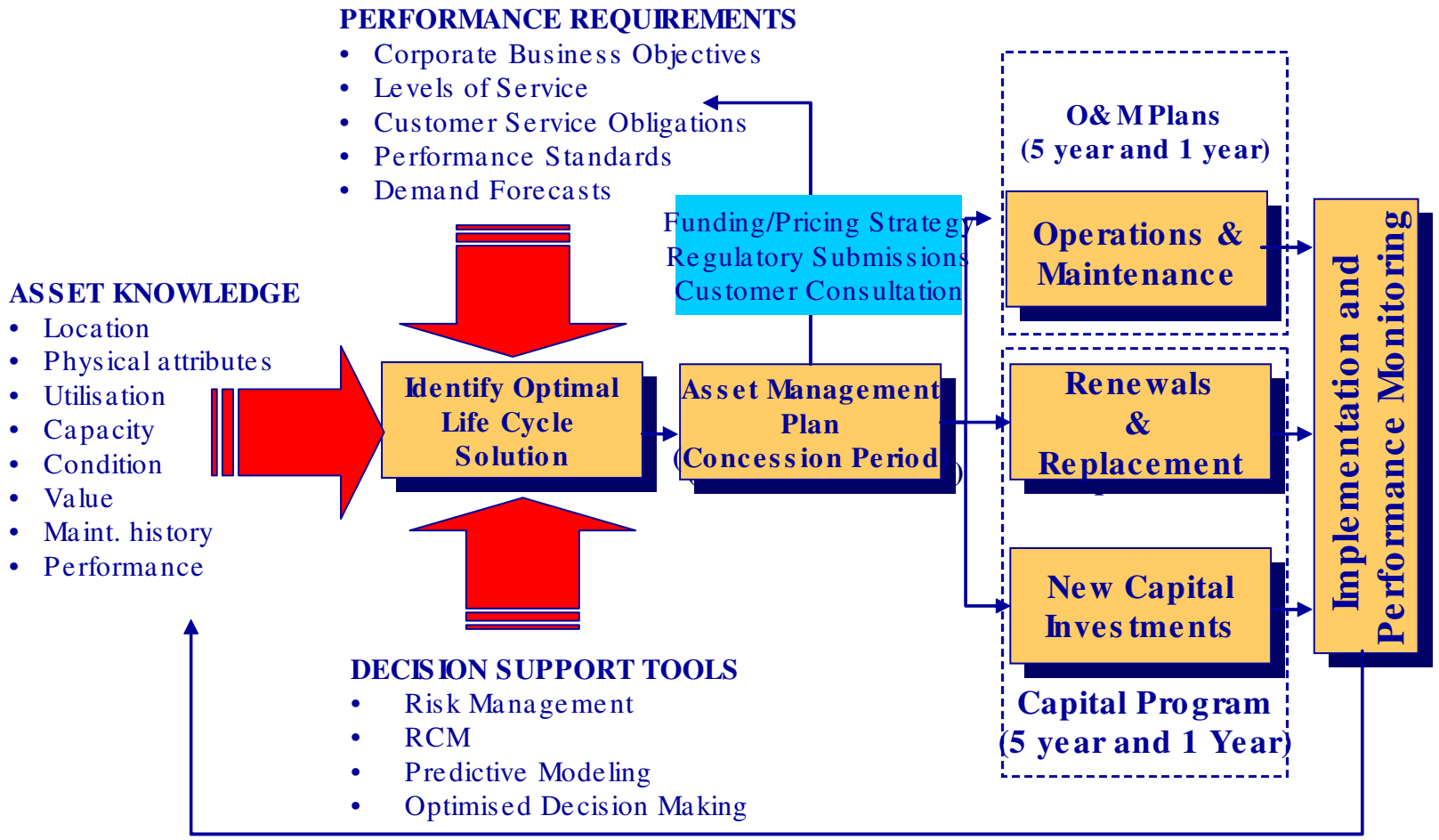
Risk assessment was used by all of the agencies in their asset management program.

Not surprisingly, the risk assessment associated with a concessionaire's participation in a public-private partnership related to those factors that affected revenue generation, while that for public services tended to be related to factors of safety, public support and customer services.

In Melbourne, a concession deed for one toll road includes:

- 39 year concession period
- Road operation and traffic management requirements
- Maintain, operate and promptly repair
- Minimize disruption
- Best practice and continuous improvement
- Comply with technical standards
- Handover requirements
  - Condition inspections
  - No defect

Asset Management



Risk assessment was also used as a way of educating and obtaining asset management buy-in from elected officials.

The scan team's sense is that all of the sites visited have better formalized applications of risk and apply them in asset management much more than in the U.S.

Efforts have been made in each case to reach out to public officials, stakeholders and, in some cases, to the general public, in conveying the importance of an asset management policy.

National Asset Management (NAMS) Steering Group

- Formed in 1995
- To further asset management best practice and knowledge within the New Zealand local government sector
- Not for profit organisation
- Activities
  - Publications
  - Training
  - Advancement of asset management

Lessons for the U.S.

Asset management programs have been used successfully to justify transportation funding (even in tight economic times) and to convey to decision makers that the investment is being delivered in the most cost effective manner possible.

Asset management programs have helped transportation agencies focus on network performance and to identify the best “value for dollar” of limited investment resources.

Adopting an asset management approach in an organization does not mean that everything has to change.

Asset management efforts are data-driven. However, developing an asset management culture in an organization does not have to await the many years it might take to develop database information systems.

Creating asset manager positions or at least assigning responsibilities for the asset management function are important foundations for an effective management program

Asset management efforts are best achieved when they are linked to strategic goals and desired outcomes.

All of the asset management programs used the concept of risk for establishing investment priorities.

Risk concepts need to be incorporated more systematically into U.S. asset management efforts.

Condition and remaining asset value are important indicators of the degree of need and level of service that are associated with different asset types….

Asset management systems are much more appropriate to use for asset valuation than straight-line depreciation accounting rules.

The integration of asset management concepts into public/private partnership agreements was an important challenge facing transportation officials….

a comprehensive asset management effort needs be part of any agreement in order to ensure the asset being returned to the owner in good condition.

Prior to contracting out core services, performance-based management systems should be in place that allows the infrastructure owner to know what levels of service are required. This was described in the scan as being a "knowledgeable owner."

Data should have a clear purpose and be directly related to asset management decision making. Data collection costs should be tracked and data itself treated as an asset, with the same design, build, operate, maintain and life cycle cost analysis as is used for other assets.

Trade-off analysis techniques are more complex than simply assessing priorities within one asset category. The scan team did not find any case where technically-based cross asset trade-off tools were used. This is an important area for further development in the U.S.

Cross-functional teams, consisting of engineers, finance analysts, operations staff, and communications experts can best understand the many different aspects of asset management, such as data collection, developing strategies, and quality assurance.

The most impressive asset management programs had a strong human resource element.

Several agency personnel systems have created job positions with asset management in the job responsibilities

Asset management training for all levels of transportation officials is an important initiative for changing the culture of an organization and in establishing asset management expectations among key stakeholders.

Finally, it is important to understand the benefits of asset management programs, as articulated by those who have been using them for many years….

Benefits in England as seen by…

Department for Transport

- Asset management is a more coherent and inclusive approach, aimed at delivery
- Demonstrates the value of the highway asset in serving wider goals
- Quantifies the financial needs, and highlights the consequences of underprovision

- The requirement for local asset management plans are making authorities think about longer term management of their assets
- Many see a major benefit in highlighting funding needs in a repeatable and defensible manner
- Some recognize that better planning will provide better value (more productive use of scarce resources)

Benefits of an Asset Management Approach at the Local Level—England

- Reduces life-cycle costs
- Defines levels of service and the ability to track performance against these
- Improves transparency in decision making
- Provides the ability to predict consequences of funding decisions
- Decreases financial, operational and legal risks
- Discharges statutory valuation and financial reporting responsibilities

County Surveyors' Society

Benefits of Asset Management in New Zealand

- Represents a more consistent and transparent approach to maintenance
- Assures funding at optimal level
- Promotes better optimization of program delivery
- Focuses attention on infrastructure management
- Provides longer term funding confidence

Benefits as Defined in Brisbane

- Provides a strategic direction and a corporately consistent planning framework for the City's physical asset and property management
- Ensures that facilities and assets are adequate to meet assessed needs (community service expectations)
- Improves utilization of the Council's asset portfolio
- Optimizes preservation of all retained assets at the lowest life cycle cost
- Identifies surplus assets and maximizes the return, in both revenue and benefit, from the disposal process.

In sum….

It is clear that asset management as an organizational culture, a “business decision-making process” and as a policy direction is a critical foundation for transportation programs that are facing significant capital renewal and preservation needs. The U.S. is clearly facing such a challenge.

Implementation

"Quick" Action Items

- Speaking engagements--All
- Continue development of asset management NT & PT by AASHTOWARE. AASHTO Subcommittee on Asset Management (Kirk)
- Repackaging existing materials for the Transportation Asset Management/Asset Management community practice website.(Sue, Steve, and Dave)
- The AASHTO Subcommittee on Asset Management prepares a resolution that establishes asset management as an important national and state policy. Kirk (try to add another whereas linked to the international side)

Implementation

- Peer exchange at KC Meeting: GIS/Asset Management. (Sue)
- Update the NHI course to reflect what has been learned (Dave and Steve). May add more implementation items.
- Hold a senior executive forum on Asset Management to introduce the senior DOT leaders to asset management concepts. This should be similar format to the Performance-based Maintenance contracting workshop. (Larry, Rob, Kirk, Don, Paul)

Implementation

- National Telecast – Webcast. North Carolina State CTE runs it. Good advertising. Panels. Call in. Place this after the forum. Aim for summer of 2006. Get some good marketing. (Rob and Lacy)
- Distribute materials at the International Conference on Managing Pavement Assets in Calgary, 2007.(Sue)

Implementation—Long Term

Refocus the national viewpoint of the transportation system from merely expenditures to investments in mobility, people, goods and services by using an asset management-based methodology

Implementation—Long Term

Task 1: Initiate a study "**Develop a national TAM model for the Interstate System**" *to determine the benefits of using asset management plans for all segments of the Interstate Highway System (Kirk and Rob and others)*

Key factors should include a risk analysis for system failure and a look at the physical degradation and its impact on the remaining service life, and overall decreased operation of the system without a comprehensive national vision and plan. The study should also list potential national performance indicators (18 months).

Implementation—Long Term

Task 2: Develop a prototype based on asset management practice in England, including national policy, performance indicators and reporting requirements for national and local agencies (Dave and Sue)

Draft correlating policy indicators and reporting requirements for the U.S., which could provide guidance on reporting national, regional and local transportation network performance.

Implementation—Long Term

Task 3: Target a state or region to take a holistic view of the entire public asset inventory providing increased funding flexibility (Paul)

Task 4: Develop linkage between transportation planning and programming and asset management at the MPO level (Rob)

Implementation—Long Term

Join with other efforts, agencies and resources to embed the topic into existing efforts on an on-going basis. Create National Asset Management Steering Committee (NAMS) in U.S. (Patricia, Dave, Kirk, Sue)

Implementation—Long Term

Several education, training, and outreach initiatives based on NAMS model

Implementation—Long Term

Write articles for APWA Reporter, Public Roads and appropriate state, municipal engineering journals.

Communicate with state, MPO and local transportation agencies to inform them of training, forums and available set of best practices.

Seek funding (FHWA, EPA, NCHRP) to support development of materials, communicate with agencies, and document best practice for inclusion in the resource clearinghouse.

Support benchmarking U.S. asset management process (rather than performance) for local, regional and state agencies. Efforts should consider incorporating AASHTO self-assessment survey.

Implementation—Long Term

Create an automated survey tool in the public domain which participating agencies can complete and have results arrayed against comparable levels of governments.

Actively market the *International Scan on Transportation Asset Management*, April 2005; list in professional associations' publication list and conferences.

Develop national competition in Transportation Asset Management led by FHWA under Transportation Planning Excellence Award (Rob)

Develop videos and training materials for use by various levels of government.

Implementation—Long Term

Extend U.S. asset management practice through research and staff studies

1. Before and after studies on the effectiveness of asset management efforts (benefits)
2. Define and quantify risk categories for an asset management program
3. Data collection and analysis for asset management
4. Plus six others

"Develop a national TAM model for the Interstate System" project will be recommended for NCHRP funding ($500,000)

Potential Use of STIP Funds;
NCHRP 8-36/20-7/20-24; FHWA Funds; Others

1) Domestic scan
2) Senior Executive Forum
3) NAMS
4) Benefits and Before/After
5) Risk categories
6) England case study